

III. "The Effect produced upon Respiration by Faradic Excitation of the Cerebrum in the Monkey, Dog, Cat, and Rabbit." By W. G. SPENCER, M.S., M.B., Assistant Surgeon to the Westminster Hospital. Communicated by Professor VICTOR HORSLEY, F.R.S. Received December 15, 1893.

(From the Pathological Laboratory of University College, London.)*

(Abstract.)

The author of the paper brings forward evidence to show that, whilst the effect upon respiration of exciting the cerebrum in a non-anæsthetised animal is probably a complex one, yet, by careful regulation of the anæsthetic state, four constant effects can be obtained upon respiration by stimulation of the cortex, and these can be traced down each in a course of its own from the cortex to the medulla oblongata. In the production of the anæsthetic state the author lays stress not only upon the drug (ether) used, but also upon the following general conditions—apnœa, loss of blood, exposure of the brain, extravasation of blood, general exhaustion of the animal, and departure from health prior to the experiment.

The four effects upon respiration obtained in this research are as follows:—

A. *Diminution of Action.*

Slowing and Arrest of the Respiratory Rhythm.—The cortical area where this result was obtained is situated just outside the olfactory tract in front of the point where the tract joins the temporo-sphenoidal lobe. On exposing successive and vertical sectional surfaces of the hemisphere the same result was obtained by exciting in the line of the strand of fibres known as the olfactory limb of the anterior commissure. After decussating at the anterior commissure, the tract is continued backwards on either side of the infundibulum into the red nucleus below and external to the aqueduct at the plane of exit of the 3rd nerve.

B. *Increased Action.*

1. *Acceleration.*—Commencing from a point on the convex surface of the cortex within the "sensori-motor" area, the effect may be followed back just below the lenticular nucleus where it borders on the outer and ventral portion of the internal capsule; the strand runs

* Grants have been made towards the research by the Royal Society and by the British Medical Association.

at first external and then ventral to the motor portion of the internal capsule, and so reaches the tegmentum. The lines from the two sides meet in the interpeduncular grey matter at the level of and just behind the exit of the 3rd nerve.

2. *Hyperinspiratory Clonus* ("snuffing movements").—This effect was obtained by excitation at the junction of the olfactory bulb and tract, and then carrying the stimulation backwards along the olfactory tract; the same result was found when the uncinate convolution of the temporo-sphenoidal lobe was irritated. Followed from the uncus this excitable region passed behind the optic tract to the crus, and then lay ventrally to the crista. The excitable tract on each side thus converged towards the middle line at the upper border of the pons.

3. *Hyperinspiratory Tonus*.—This experimental result is of such frequency and constancy as to be clearly an important general phenomenon. It can be elicited in various ways: *e.g.*, excitation of the descending motor tract in the corona radiata and internal capsule yielded this result; so did excitation of the 5th nerve and dura mater, as well as the sciatic nerve, both before and after complete removal of the cerebrum at the tentorium cerebelli.

The author finds medullated fibres in prepared microscopical vertical (frontal) sections of the brain running in the same course as that indicated by faradic excitation of the living surface of the section of the hemisphere. For his conclusions he has relied solely upon tracings of the respiratory movements. Fifty-six tracings are included as illustrations, together with thirty photographs of brains and brain sections to show the precise points excited. The author records his thanks to Mr. Horsley for help, and to Dr. Howard Tooth for the loan of excellently-prepared sections.

IV. "The Pathology of the Œdema which accompanies Passive Congestion." By WALTER S. LAZARUS-BARLOW, M.B., M.R.C.P. Communicated by Professor ROY, F.R.S. Received December 22, 1893.

(From the Pathological Laboratory, Cambridge.)

(Abstract.)

The author reviews the literature of the subject, and points out that the question of time has not been sufficiently considered by previous investigators.

He examines the view which, at present, is usually accepted, and which explains the œdema accompanying passive congestion upon purely mechanical principles.